

Creighton, Missouri
Water Supply Study
City Lake

Creighton is located in the South East corner of Cass County, Missouri.

The record period of drought was used to estimate if Creighton water supply was adequate to provide ample water for the city. The 1950's were determined to be that period.

The 30-year average rainfall is 42.05 inches. Rainfall at the Harrisonville gage was used in this analysis. For the period 1953 through 1957, annual rainfall was 28.8, 35.7, 28.4, 21.3, and 37.5 inches.

Creighton is not a major water user and they are not currently reporting their water use. Usage in the Safe Drinking Water Information System (SDWIS) database indicates they are using an average of 28,000 gallon per day. The plant capacity is reported at 36,000 gallon per day and the maximum day reported was at a rate of 35,000 gallon per day.

Demand for year 2000 was 28,000 gallon per day.
Optimized demand is 65,584 gallon per day.

Creighton's Lake analysis consisted of using the NRCS's computer program "RESOP". This program analyzes remaining stored water at the end of each month by summing gains and losses.

Following is the data and procedures for input to the "RESOP" program.

STO-AREA -- Elevation-Storage and Elevation-Area data were determined from
June, 28, 2003 survey made by USGS.

Creighton City Lake

Elevation Feet	Area Acres	Volume Acre-Ft.	
806	0.09	0.03	
808	0.4	0.4	
810	1.0	1.7	
812	2.2	4.6	
814	5.0	11.7	
816	7.6	24.5	
818	10.0	41.9	
820	12.6	64.5	
820.2	13.0	67.06	Water Surface on 6/28/2003
822	16.6	93.8	
823	18.9	111.4	
823.2	19.4	112.9	Spillway Elevation

LIMITS Full Pool storage 112.9 Ac.Ft.
 Minimum Pool storage 15 Ac.Ft.

Starting storage was considered at full pool elevation.

The drainage area of the lake is 0.83 square miles.

GENERAL	<p>The adjustment factor of 0.76 to convert from pan evaporation to lake evaporation was applied prior to entering the data for the control word EVAP. As a result a factor of 100 is applied.</p> <p>The record period of drought is in the 1950's. Analysis began in January 1951 and ended December 1959.</p>
SEEPAGE	The reservoir seepage varied from 0 seepage near empty to a maximum of 0.75 inch per month at full pool. The material in the dam is compacted earth of clayey soils.
RAINFALL	Rainfall data came from the Harrisonville, Mo. rain gage for the period 1951 through 1959.
RUNOFF	<p>This is the runoff into the lake from its drainage area. Regional monthly runoff values were determined from stream gage data.</p> <p>Monthly runoff volumes in watershed inches was determined at the Little Blue River gage near Lake City, North East of Drexel. Another gage on Cedar Creek near Pleasant View, Missouri was analyzed. Results at the lake were nearly the same. Because Little Blue River watershed is nearer to Creighton, and the soils and topography of Little Blue River is more nearly like that at Creighton, it was selected to represent regional runoff.</p> <p>If runoff did not appear reasonable when compared to rainfall, it was necessary to examine daily Rainfall values for that month. Antecedent moisture was estimated for each rainfall event and adjustments to NRCS runoff curve number was made to arrive at runoff for each storm.</p>
EVAP	Pan evaporation at the Lakeside gaging station near the Lake of the Ozarks was used to determine pan evaporation. The adjustment to lake evaporation was 0.76.
DEMAND	Creighton has not been reporting their water use because they are not considered to be major water users. This RESOP run was for the daily use recorded in the SDWIS data base. The daily amount recorded is 0.028 MGD. The optimized use would be 0.069 million gallon per day.

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Storage Volume

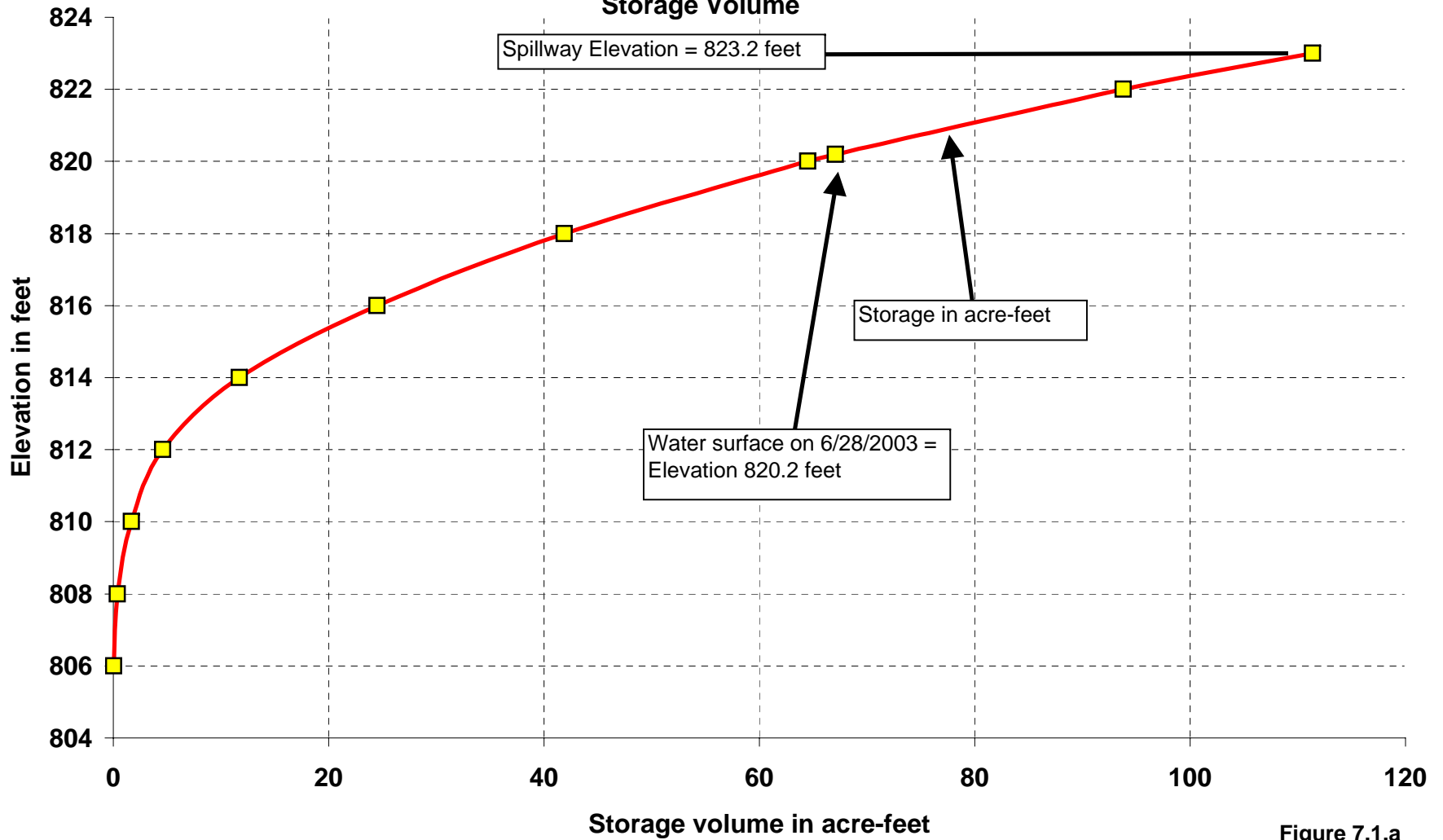


Figure 7.1.a

Creighton, Missouri

Water Supply Study

City Lake

Surface Area

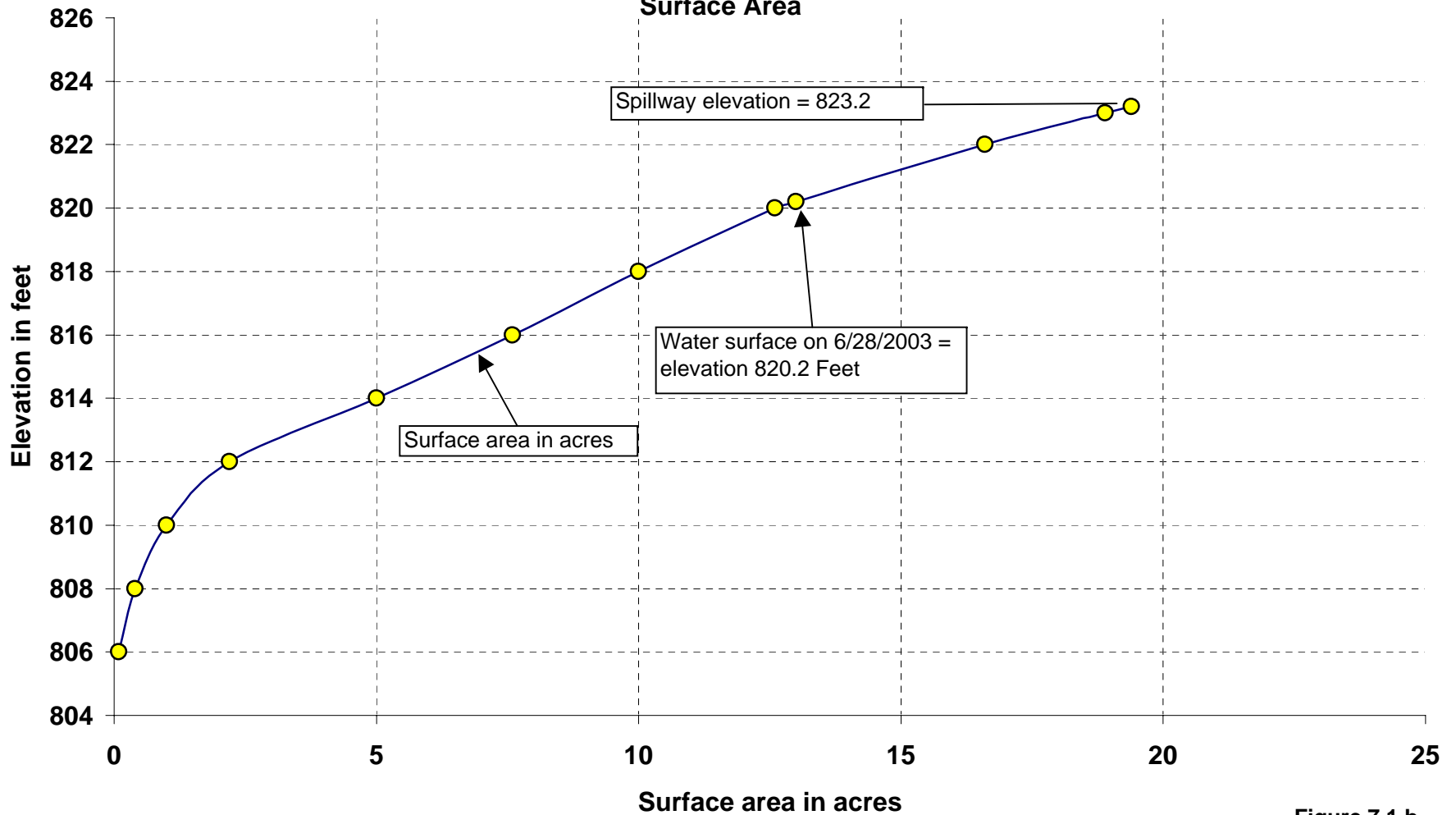


Figure 7.1.b

Creighton, Missouri

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City Lake

Lake Storage

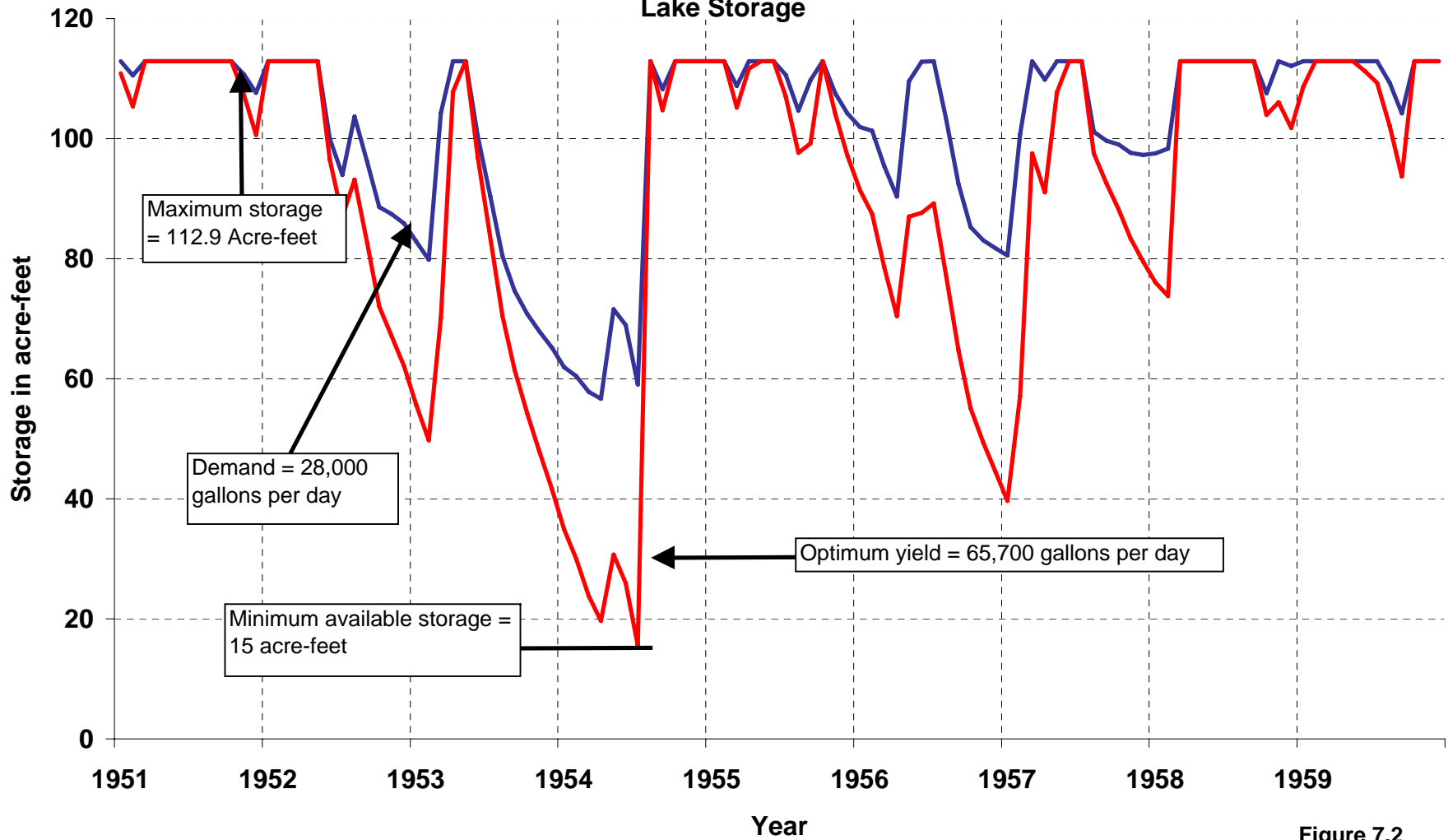
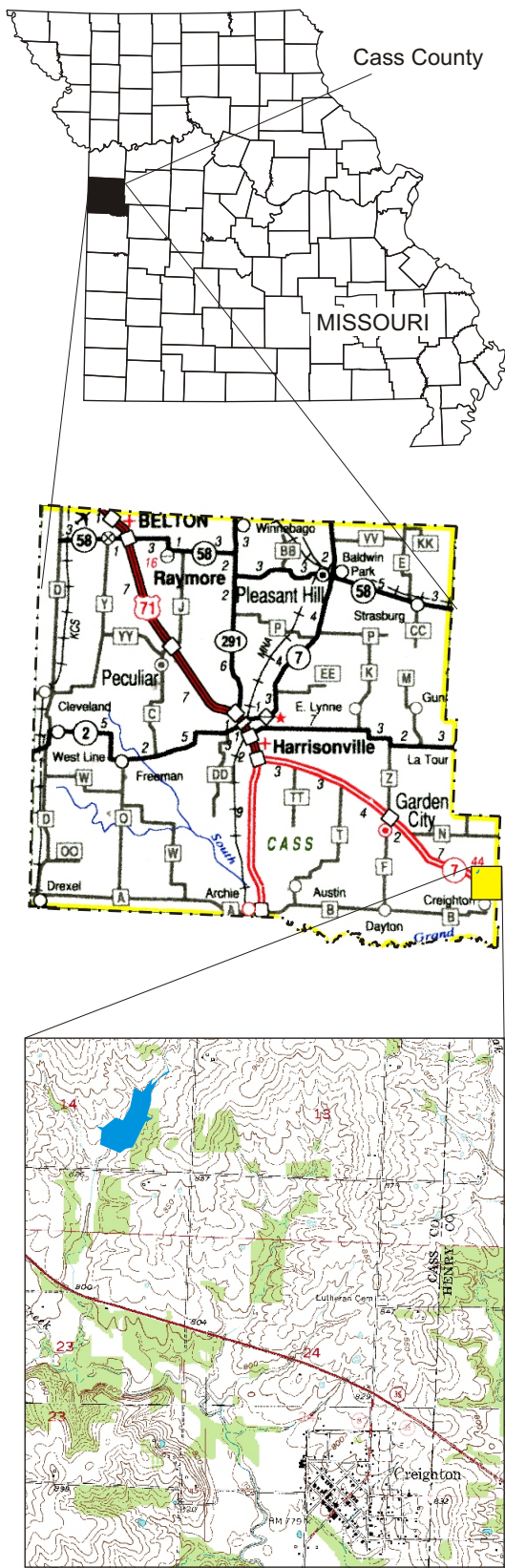


Figure 7.2

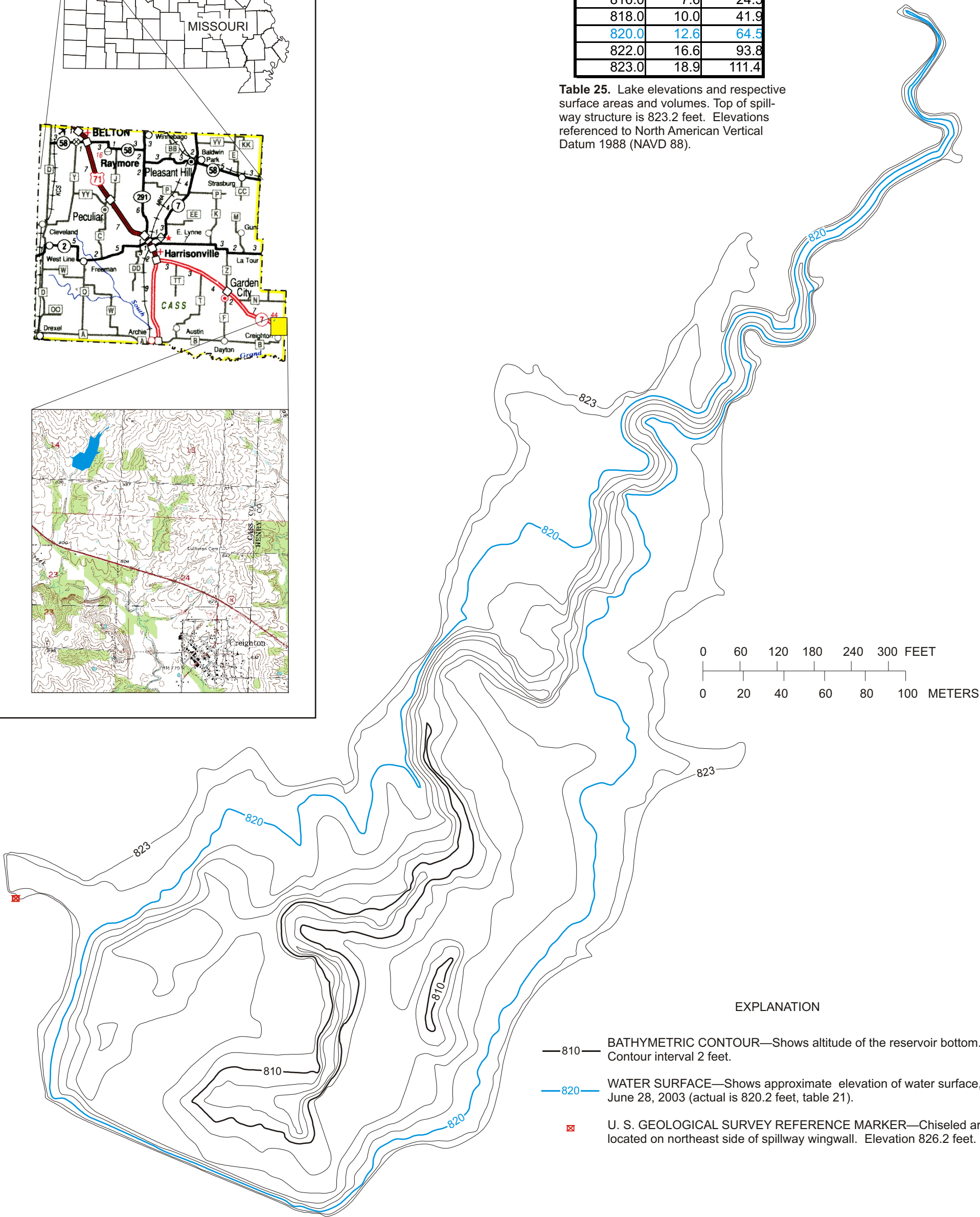
CREIGHTON LAKE

LOCATION MAP



Elevation (feet)	Area (acres)	Volume (acre-ft)
806.0	0.09	0.03
808.0	0.4	0.4
810.0	1.0	1.7
812.0	2.2	4.6
814.0	5.0	11.7
816.0	7.6	24.5
818.0	10.0	41.9
820.0	12.6	64.5
822.0	16.6	93.8
823.0	18.9	111.4

Table 25. Lake elevations and respective surface areas and volumes. Top of spillway structure is 823.2 feet. Elevations referenced to North American Vertical Datum 1988 (NAVD 88).



EXPLANATION

- 810 BATHYMETRIC CONTOUR—Shows altitude of the reservoir bottom. Contour interval 2 feet.
- 820 WATER SURFACE—Shows approximate elevation of water surface, June 28, 2003 (actual is 820.2 feet, table 21).
- U. S. GEOLOGICAL SURVEY REFERENCE MARKER—Chiseled arrow located on northeast side of spillway wingwall. Elevation 826.2 feet.

Figure 25. Bathymetric map and table of areas/volumes of the Creighton Lake near Creighton, Missouri.